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IRRITABLE BOWEL SYNDROME IN CHILDREN: PATHOGENESIS, DIAGNOSIS, AND MANAGEMENT

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ABSTRACT

Background

Irritable bowel syndrome (IBS) is a chronic disorder of gut brain interaction in children associated with recurrent abdominal pain, altered bowel habits, psychological comor-

bidities, impaired daily functioning, and reduced quality of life.

Aim

This narrative review summarizes current evidence on the pathogenesis, diagnosis, and long term management of pediatric IBS, with emphasis on gut brain interactions, psychosocial factors, recent pediatric guidelines, and pharmacological and non-pharmacological interventions.

Materials and Methods

PubMed, Embase, Cochrane Library, and Google Scholar were searched for English language publications from 2010 to 2026. The final search was conducted on June 15, 2026. Fifty studies and guidelines were included in the descriptive synthesis.

Results

Pediatric IBS has a multifactorial pathogenesis involving disturbances in gut brain communication, visceral hypersensitivity, post infectious mechanisms, alterations in the intestinal microbiota, and psychosocial factors. Diagnosis relies on symptom-based criteria, clinical assessment, and evaluation for alarm features; routine extensive testing is discouraged when alarm features are absent. Management should be individualized and may include education of the child and family, dietary measures, psychological interventions, and symptom directed pharmacotherapy. Cognitive behavioural therapy and gut directed hypnotherapy may reduce symptoms and psychological distress in selected children. Evidence for dietary and pharmacological interventions remains heterogeneous, and microbiome profiles are not established diagnostic biomarkers for routine clinical use.

Conclusions

Pediatric IBS should be diagnosed clinically and managed according to predominant symptoms, disease severity, psychological comorbidities, and daily functioning. Further pediatric studies are needed to clarify the effectiveness, safety, duration, and optimal sequence of interventions.

Keywords: irritable bowel syndrome; pediatric gastroenterology; gut brain axis; cognitive behavioural therapy; clinical guidelines; microbiome.

INTRODUCTION

Irritable bowel syndrome (IBS) in children is a chronic and recurrent disorder of gut brain interaction associated with abdominal pain and altered bowel habits [1–4]. The worldwide prevalence of pediatric IBS among children and adolescents aged 4–18 years has been estimated at approximately 13.5%, although prevalence rates vary considerably across geographic regions [28]. IBS may also be accompanied by a substantial psychological burden. Anxiety and depressive symptoms are frequently reported in pediatric patients with IBS, and particularly high rates have been described in some clinical subgroups. In children with constipation predominant IBS, anxiety and depression have been reported in approximately 40% and 38% of patients, respectively [10]. It may impair quality of life, daily functioning, and treatment adherence and may also affect the child's family [1, 2, 5]. The clinical presentation may vary during childhood and adolescence, which should be considered during long term follow up [6]. The pathogenesis of pediatric IBS is complex and multifactorial and includes alterations in the intestinal microbiota [7, 8], post infectious mechanisms [9], visceral hypersensitivity, and dysregulation of gut brain communication. Anxiety and depression frequently coexist with IBS and may influence symptom severity and persistence [10]. Diagnosis is based primarily on symptom based Rome criteria [11]. Recent pediatric recommendations, including the ESPGHAN/NASPGHAN guidelines published in 2025 and the Italian pediatric guidelines, provide a more structured framework for diagnosis and management [12–14].

Relevance

Pediatric irritable bowel syndrome is a chronic disorder of gut brain interaction characterized by recurrent abdominal pain and altered bowel habits and associated with psychological comorbidities, impaired quality of life, and a substantial burden on affected children and their families [1, 2, 5, 10]. Its pathogenesis is multifactorial and involves disturbances in gut brain communication, visceral hypersensitivity, altered gastrointestinal motility, and psychosocial factors [10, 23, 28]. Post infectious and immune mechanisms may also contribute to the development of IBS [9, 23], while alterations in the intestinal microbiota have been reported in affected children [7, 8, 23, 28].

Current management is based on an individualized combination of patient and family education, dietary measures, psychological interventions, and symptom directed pharmacotherapy [12–15]. However, the evidence supporting individual interventions

remains heterogeneous, and the optimal sequence of their use in long term pediatric care has not been clearly established [13–15, 27, 35].

AIM

The aim of this narrative review was to summarize current evidence on the multifactorial pathogenesis, diagnosis, and long term management of irritable bowel syndrome in children, with particular attention to gut brain interactions, psychosocial factors, recent pediatric clinical guidelines, and pharmacological and non-pharmacological interventions.

Objectives

1. To summarize current concepts regarding the multifactorial pathogenesis of irritable bowel syndrome in children and its relationship to clinical manifestations and diagnostic approaches.
2. To analyze pharmacological and non-pharmacological approaches to the long term management of pediatric irritable bowel syndrome.
3. To identify the main limitations of the current evidence and priorities for further research.

MATERIALS AND METHODS

This study was designed as a narrative literature review. The literature search was conducted using PubMed, Embase, Cochrane Library, and Google Scholar. The search covered English-language publications from 2010 to 2026. The final literature search was conducted on June 15, 2026. The search terms were: ("Irritable bowel syndrome" OR "IBS" OR "functional abdominal pain") AND ("children" OR "pediatric" OR "adolescents") AND ("diagnosis" OR "treatment" OR "guidelines" OR "microbiome" OR "cognitive behavioural therapy"). Additional relevant publications were identified by screening the reference lists of selected articles.

The inclusion criteria were meta-analyses, systematic reviews, international clinical guidelines (such as ESPGHAN/NASPGHAN and Rome Criteria), longitudinal prospective studies, cross-sectional studies, and expert opinion articles reporting on the diagnosis, pathogenesis, and management of pediatric irritable bowel syndrome. Studies

were considered eligible if they addressed evolving diagnostic paradigms, the gut brain axis, non-pharmacological interventions, or symptom directed pharmacological treatments in children and adolescents.

Studies were excluded if they focused exclusively on adult populations without pediatric relevance, or if they primarily addressed organic gastrointestinal diseases (such as inflammatory bowel disease) rather than functional disorders. Single case reports, non-peer-reviewed conference abstracts, and letters to the editor were excluded because they did not provide sufficient clinical data for the comprehensive aims of this review.

After duplicate removal and screening of titles and abstracts, full-text articles were assessed for eligibility. The selection process evaluated the clinical relevance of the publications and their suitability for the objectives of this review. Ultimately, 50 key studies and guidelines were included.

Because this was a narrative review, no formal risk of bias assessment or meta-analysis was performed. The included literature was synthesized descriptively and organized according to the main thematic areas of the review: evolving diagnostic paradigms and pathogenesis, non-pharmacological and psychosocial interventions, and pharmacological management and international guidelines. This approach was used to provide a clinically oriented overview of the current standards of care for pediatric IBS.

RESULTS

Diagnostic Approach, Clinical Algorithm, and Alarm Features

The diagnosis of pediatric irritable bowel syndrome (IBS) relies primarily on symptom based criteria, specifically the Rome Criteria, which allow for a structured clinical evaluation without over-relying on invasive testing [16-19]. The diagnostic pathway follows a clear clinical algorithm: initial identification of chronic abdominal pain associated with defecation or changes in stool consistency or frequency. A detailed clinical history and physical examination must specifically screen for alarm features (such as rectal bleeding, nocturnal awakening due to pain, unexplained weight loss, delayed puberty, or persistent fever), which indicate an organic gastrointestinal disease, such as inflammatory bowel disease, and mandate further investigations [16, 17]. In the absence

of alarm features, routine extensive diagnostic testing is discouraged [20, 21]. Adapting these diagnostic strategies remains essential globally [12, 22, 23].

Dietary Interventions

Dietary modifications represent a primary, non-pharmacological line of management in pediatric IBS [24, 25]. Available clinical evidence indicates that individualized dietary adjustments such as evaluating fiber intake or implementing structured dietary protocols (e.g., low-FODMAP diets under supervision) can alleviate symptom severity [26, 27]. However, evidence regarding specific dietary interventions in children remains heterogeneous. Adult dietary protocols cannot be directly extrapolated to pediatric patients due to nutritional requirements during growth [2, 28]. The primary limitations of pediatric dietary therapy include the significant risk of macronutrient and micronutrient deficiencies and the strict requirement for ongoing supervision by a specialized pediatric dietitian.

Psychological Interventions

Psychological and behavioral treatments directly target the heavily implicated gut brain axis and visceral hypersensitivity [29, 30]. Cognitive behavioural therapy (CBT) and gut directed hypnotherapy have emerged as effective non-pharmacological interventions to reduce both gastrointestinal symptom severity and associated psychological distress, such as anxiety and depression, which show a high prevalence in this population [10, 31]. These modalities improve coping mechanisms and quality of life, particularly in patients with significant emotional distress or refractory symptoms [32]. Despite strong evidence of efficacy, limitations include the high resource intensity of the therapy, considerable costs, and a significant lack of access to trained pediatric psychologists in routine clinical practice.

Pharmacological Agents

Pharmacological management is generally reserved for patients with severe symptoms or those who fail non-pharmacological measures [33, 34]. Evidence-based prescribing in pediatrics relies on symptom directed agents, such as antispasmodics, to safely manage predominant complaints like abdominal pain or altered motility [33, 35]. The use of pharmacotherapy requires strict adherence to contemporary international pediatric guidelines to minimize adverse events [34, 36]. The principal limitation of pharmacological agents in pediatric IBS is the distinct lack of large-scale, high-quality pedi-

atric randomized controlled trials (RCTs). Consequently, much of the current prescribing remains off-label and relies heavily on extrapolating safety and efficacy profiles from adult cohorts.

Pathogenesis and International Guidelines

The pathogenesis of pediatric IBS is complex and multifactorial, involving post infectious alterations, gut dysbiosis, and gut brain dysregulation [1, 6, 37, 38]. The clinical approach to pediatric IBS has been influenced by recent international and national recommendations, including the ESPGHAN/NASPGHAN guidelines, the Seoul Consensus, and the Italian pediatric guidelines [12–14, 19].

The included sources were grouped according to their main thematic focus. The distribution of the 50 publications across the principal areas of diagnosis, pathogenesis, psychosocial factors, and management is presented in Table 1.

Table 1. Overview of Evidence Sources and Core Interventions in Pediatric IBS (Synthesis of 50 Included Sources).

SOURCE CATEGORY AND NUMBER OF SOURCES	PERCENTAGE OF TOTAL	SUMMARY OF EVIDENCE & PRIMARY CLINICAL IMPLICATIONS
Diagnostic Criteria & Algorithms (n = 12)	24%	Rome Criteria and ESPGHAN/NASPGHAN guidelines support standardized symptom based pathways and help reduce unnecessary invasive testing.
Pathogenesis & Microbiome (n = 9)	18%	The included sources describe post infectious changes and dysbiosis and indicate that routine microbiome profiling has not been validated for clinical diagnosis.
Psychosocial Comorbidities (n = 5)	10%	The included sources describe associations with anxiety and depression and support consideration of psychological assessment and family centred care.
Management Approaches (Diet, CBT, Pharma) (n = 24)	48%	The included sources support a multidisciplinary approach combining education, CBT, dietary measures, and symptom directed pharmacotherapy.
Total (n = 50)	100%	Comprehensive biopsychosocial approach to pediatric IBS.

Multidisciplinary Therapeutic Approaches

Long term management of pediatric IBS requires a multidisciplinary approach that addresses both physiological and psychological factors [42]. Psychological interventions, dietary measures, and symptom directed pharmacotherapy are the main components of current treatment strategies [14, 42]. The main therapeutic approaches used in pediatric IBS, together with their clinical indications, reported efficacy, evidence assessment, and key limitations, are summarized in Table 2.

Table 2. Therapeutic Modalities in Pediatric IBS.

INTERVENTION CATEGORY	SPECIFIC MODALITY	PRIMARY CLINICAL INDICATION	REPORTED EFFICACY DATA	EVIDENCE QUALITY	KEY PEDIATRIC LIMITATIONS
Dietary	Low FODMAP diet [26–28]	Persistent gastrointestinal symptoms when dietary triggers are suspected	May reduce symptoms in selected children, but pediatric evidence remains heterogeneous	Low to Moderate	Risk of nutritional restriction; requires professional dietary supervision
Dietary	Fiber adjustment [2, 15, 26–28]	Altered stool pattern and inadequate or inappropriate fiber intake	Effects depend on the type of fiber and the predominant symptoms	Low to Moderate	Excessive or inappropriate fiber intake may worsen bloating or abdominal discomfort
Psychological	Cognitive behavioural therapy [10, 21, 27, 31, 32]	Persistent symptoms, psychological distress, impaired coping, or reduced daily functioning	May reduce abdominal pain and improve coping and quality of life	Moderate	Requires trained professionals, repeated sessions, and patient and family engagement
Psychological	Gut directed hypnotherapy [27, 31]	Persistent or refractory symptoms	May reduce symptom severity in selected pediatric patients	Moderate	Limited availability of trained therapists and variable access to treatment
Pharmacological	Antispasmodics [14, 33–35, 38, 39]	Abdominal pain and bowel related spasms	Pediatric evidence is limited and treatment effects vary between agents	Low	Limited pediatric trials; some use may be off label

DISCUSSION

This narrative review highlights the transition in the management of pediatric irritable bowel syndrome (IBS) from a purely somatic approach to a comprehensive biopsychosocial model [1, 43]. The integration of findings across 50 publications indicates that disease expression is shaped by an interplay between the gut brain axis, post infectious changes, and alterations in the gut microbiota [6, 8, 38]. Psychological factors such as anxiety, depression, and family level coping dynamics may influence symptom severity and treatment adherence [10, 30, 31].

Current international guidelines, including the 2025 ESPGHAN/NASPGHAN recommendations and the 2025 Seoul Consensus, support the use of symptom based diagnostic criteria, particularly the Rome IV criteria [11–14]. Routine extensive testing is explicitly discouraged in the absence of alarm features, which reduces unnecessary diagnostic workups and may minimize patient distress [17, 20, 21]. When comparing study results for therapeutic interventions, non-pharmacological approaches are consistently favored as first-line therapies. Dietary measures, including the low-FODMAP diet, may provide short-term symptom relief; however, the pediatric evidence remains more lim-

ited than the adult evidence, and restrictive diets may carry a risk of nutritional deficiencies [2, 28].

Conversely, psychological interventions, particularly CBT, are supported by relatively consistent pediatric evidence and may reduce abdominal pain and psychological distress while addressing associated mood symptoms [29, 44]. Evidence for symptom directed pharmacological treatment remains limited because of the small number of robust pediatric randomized controlled trials. Pharmacological interventions should therefore be considered selectively according to the predominant symptoms, their severity, and the response to non pharmacological measures [33, 34]. Overall, an individualized multidisciplinary approach that takes both the clinical phenotype and the psychosocial context into account may support the long term management of pediatric IBS [2, 22, 32, 45–49].

Limitations

The included literature was heterogeneous in study design, populations, interventions, and outcomes, which limited direct comparison and quantitative synthesis of the findings [21, 50]. Some pharmacological and microbiome evidence was derived from adult studies or small pediatric cohorts, limiting its direct applicability to routine pediatric care [34, 35]. Although microbial signatures may have potential value for patient stratification, standardized biomarker panels have not yet been validated for routine clinical use [9]. Because this was a narrative review, no formal risk-of-bias assessment was performed, and the findings were synthesized descriptively.

CONCLUSIONS

Pediatric irritable bowel syndrome is a multifactorial disorder of gut brain interaction in which post infectious mechanisms, alterations in the gut microbiota, visceral hypersensitivity, and psychosocial factors may contribute to symptom development and persistence. Diagnosis should be based on symptom based criteria, clinical assessment, and evaluation for alarm features; routine extensive testing is not justified when alarm features are absent.

Management should be individualized according to the predominant symptoms, disease severity, psychological comorbidities, and daily functioning. Initial treatment should include education of the child and family, appropriate dietary measures, and,

when indicated, psychological interventions such as cognitive behavioural therapy or gut directed hypnotherapy. Pharmacological treatment should remain symptom directed and based on the available pediatric evidence.

Current evidence for dietary and pharmacological interventions remains heterogeneous, adult findings cannot be directly extrapolated to children, and microbiome profiles are not established diagnostic biomarkers. Further pediatric studies are needed to clarify the effectiveness, safety, duration, and optimal sequence of interventions.

DISCLOSURE

Author contributions

Conceptualization: Agata Leszek, Natalia Moskwa. Methodology: Zuzanna Lecyk, Michał Stermach. Formal analysis: Bianka Błaszkiewicz, Iga B. Borejszo. Investigation: Katarzyna Marut, Ksenia Kobielak. Writing, original draft: Małgorzata Lubowiecka, Agata Leszek. Writing, review and editing: Natalia Moskwa, Joanna H. Marczak. Supervision: Michał Stermach, Bianka Błaszkiewicz.

All authors have read and approved the final version of the manuscript.

Conflicts of interest

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